

ORIGINAL



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Cobalt-60 (Co-60)

T_{1/2} = 5.271 y

Decay by beta decay, gamma emission

Decay to Ni-60 (stable), **after 40 years** less than 0.0075 fraction of activity remaining

Cesium-137 (Cs-137)

T_{1/2} = 30.17 years

Decay by beta decay, gamma emission

Decay to Ba-137 (stable), **after 211 years** less than 0.0075 fraction of initial activity remaining

Lead-210 (Pb-210)

T_{1/2} = 22.3 years

Decay by beta to Bi-210, then Po-210, and alpha decay to Pb-206

Decay to Pb-206 **after 156 years** less than 0.0075 fraction of initial activity remaining

Radium-226 (Ra-226)

T_{1/2} = 1600 years

Decay by alpha decay to Rn-222, to Pb-210

After 11,200 years less than 0.0075 fraction of initial activity remaining

Actinium-227 (Ac-227)

T_{1/2} = 21.773 years

Decay by alpha emissions to Fr-223 (unstable), eventually to Pb-207 (stable)

After 159 years less than 0.0075 fraction of initial activity remains

Neptunium-237 (Np-237)

T_{1/2} = 2.14 E6 years

Decay by alpha emissions thru Neptunium series to many alpha emitters

Much left after even one half life 2,140,000 years

The use of these radio nuclides at the site was between the years of 1950-1960. Only H-3 was used in production at the site until 2007. Any radionuclide remaining at the site was a waste or a product of contamination that remained onsite.

1950 to 2010 is 60 years. If there is one Curie of activity of any of the COCs from 1950's, the following would remain:

Co-60, less than $0.001 \times 1 = 1\text{m Ci}$, still very radioactive.

Cs-137, approx. 0.25 Ci

Pb-210, 0.13 Ci

Ra-226, almost all the initial activity ✓

Ac-227, approx. 0.15 Ci ✓

Np-237, almost all the initial activity ✓

what does this mean?
↓
millions

The above-listed radionuclide's of concern hazardous substances in accordance with NCP § 302.4.